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The Alpine Envirnomental Data Analysis Centre (AlpEnDAC.eu): Cloud-Computing on Demand, RDM and more

Stephan Hachinger (1), Julian Meyer-Arnek (2), Christoph Harsch (3), Michael Bittner (2,3), Anton Frank (1), Helmut Heller (1), Natalie Vogel (1), and Esther Giemsa (4)

(1) Leibniz Supercomputing Centre (LRZ), Bavarian Academy of Sciences & Humanities, Garching b. M., Germany., (2) Earth Observation Centre, German Aerospace Center (DLR), Oberpfaffenhofen/Weßling, Germany, (3) Institute of Physics, University of Augsburg, Augsburg, Germany, (4) Institute of Geography, University of Augsburg, Augsburg, Germany

The "Alpine Environmental Data Analysis Centre" (AlpEnDAC), a research data management and analysis platform for research facilities around the alps and similar mountain ranges, has recently started productive operation. It is part of the technical framework of the Bavarian Environmental Research Station Schneefernerhaus / Zugspitze (UFS) and serves as the computational infrastructure for the Virtual Alpine Observatory, VAO (http://www.vao.bayern.de), a network of European high-altitude research stations.
The AlpEnDAC platform offers much more than pure data management: via a user-friendly web-based graphical user interface (GUI/portal), "Computing-on-Demand" simulations can be triggered on a large local IAAS Compute Cloud, and the results are immediately visualised. With a co-development approach, modelling codes requested by the user base – a multidisciplinary community, with atmospheric sciences being one focus – are integrated into the analysis centre. Thus, the most relevant and common use cases can be supported directly via the web portal, where also scientists not familiar with computational methods can get acquainted with the models, and profit from there usage. For exceptionally demanding use cases, it is then possible to execute our workflows on large-scale HPC clusters with the support of the AlpEnDAC team.
In the first phase of AlpEnDAC, we have integrated the air-mass transport models FLEXTRA, FLEXPART (A. Stohl et al./ NILU) and HYSPLIT (NOAA), with which scientists can conveniently and quickly trace the origin of air masses they are analysing at high-altitude research facilities. The web GUI offers a seamless experience, where simulation results can be visualised together with measured data. The research data management component, accessible via the same GUI, consistently relies on state-of-the-art backend components such as a Neo4j-based metadata store and an iRODS data-management system. A further development phase of AlpEnDAC, beginning this year, will not only bring an extension of the modelling and analyisis software portfolio, but also e.g. python-based workflows for automatic reactions to the outcomes of simulations such as the triggering of instruments.
Our mission is to enable more and more environmental scientists to profit from modern data-management, data-analysis and simulation techniques. The VAO network, now including eight countries (Austria, France, Germany, Georgia, Italy, Norway, Slovenia and Switzerland) is an ideal context for developing the AlpEnDAC with researchers. Within the VAO, where scientific problems relating to the atmosphere, biosphere, hydrosphere and cryosphere are addressed in great depth, and forefront research on environmental medicine is conducted, our data centre shall be a central component in everyday scientific work and knowledge exchange.